

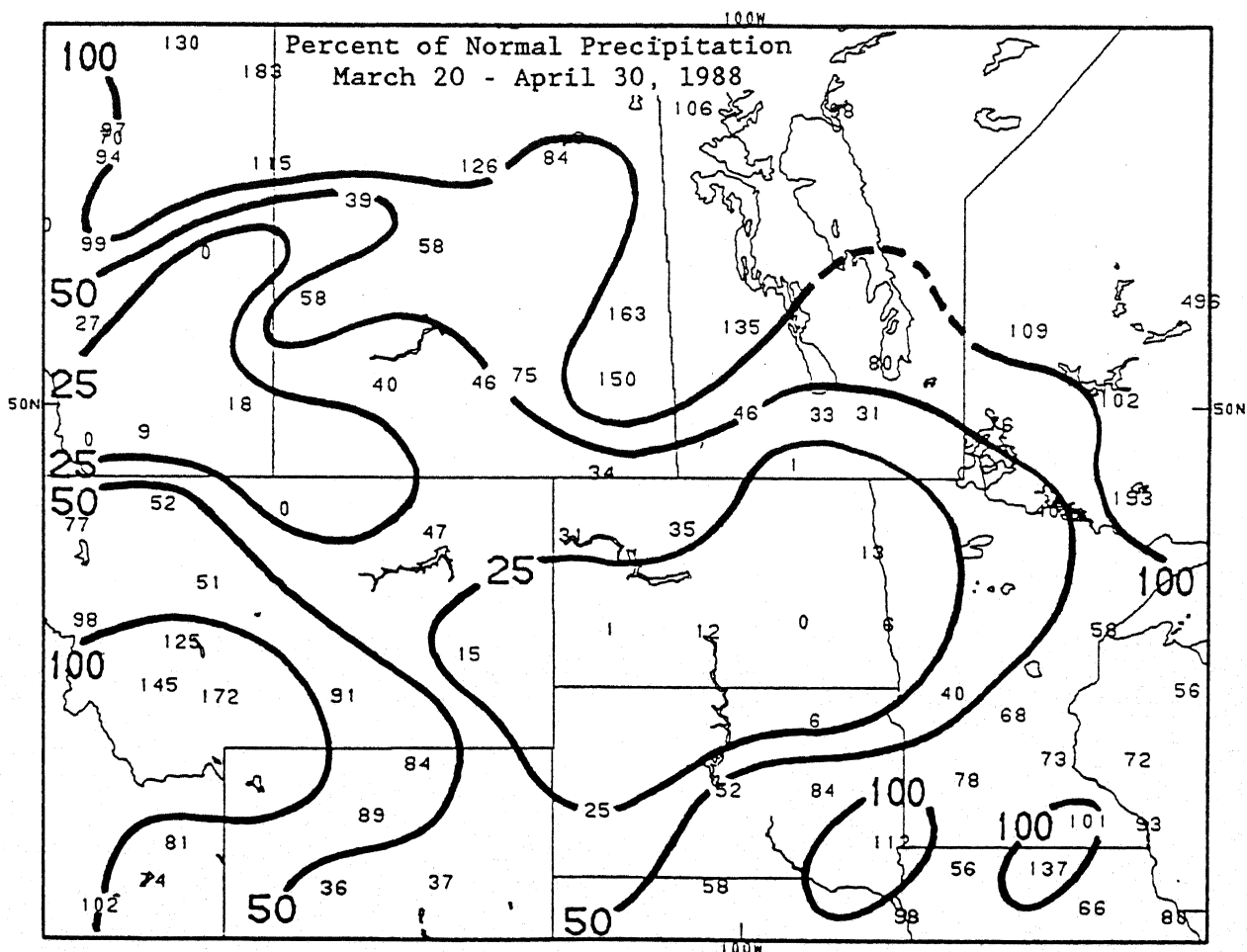


# WEEKLY CLIMATE BULLETIN

No. 88/18

Washington, DC

April 30, 1988



PRECIPITATION NORMALLY INCREASES IN THE SPRING AND REACHES A MAXIMUM DURING THE SUMMER MONTHS IN THE NORTHERN GREAT PLAINS, UPPER MIDWEST, AND SOUTHERN CANADA. SO FAR THIS SPRING, HOWEVER, PRECIPITATION HAS BEEN RATHER DEFICIENT THROUGHOUT MOST OF THE AREA AS THE GROWING SEASON GETS UNDERWAY. REFER TO THE SPECIAL CLIMATE SUMMARY FOR FURTHER DETAILS.

NOAA - NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL CENTER



# GLOBAL CLIMATE HIGHLIGHTS

## MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JANUARY 9, 1993

### 1. Southwestern Canada and Northwestern United States:

#### **COLD WEATHER PERSISTS.**

Temperatures averaged as much as 12°C below normal, and a few stations reported daily lows between -35°C and -40°C [3 weeks].

### 2. Western United States:

#### **MORE STORMS POUND REGION.**

Heavy rains (up to 150 mm) caused flooding in parts of Arizona, southern California, and northwestern Mexico. Farther north, almost two feet of snow buried Salt Lake City, and heavy snows also blanketed parts of central and northern California and northern Nevada. Six-week moisture surpluses ranged from 80 to 160 mm [3 weeks].

### 3. Central South America:

#### **HEAVY RAINS CONTINUE.**

Nearly 150 mm of rain inundated parts of northern Paraguay, southern Brazil, western Uruguay, and northeastern Argentina. Since late November, precipitation surpluses approached 260 mm [9 weeks].

### 4. Northern Scandinavia:

#### **UNSEASONABLY MILD CONDITIONS DEVELOP.**

Temperatures averaged as much as 8°C above normal as abnormally mild weather covered northern portions of Norway, Sweden, and Finland [2 weeks].

### 5. Southwestern Europe and Northwestern Africa:

#### **STILL VERY DRY.**

Little or no precipitation fell on most of the region, although scattered totals of 10 to 30 mm dampened central and northeastern Morocco. Six-week moisture deficits approached 300 mm at some locations [8 weeks].

### 6. Eastern Europe, Southwestern Asia, and Northeastern Africa:

#### **WINTRY WEATHER PERSISTS.**

Temperature departures ranged from -4°C to -9°C across most of the region as cold air remained entrenched [8 weeks]. According to press reports, heavy snow paralyzed portions of Turkey while widespread flooding afflicted Baghdad [Episodic Events].

### 7. Southern Iran and Western Pakistan:

#### **HEAVY RAINS DRENCH REGION.**

Up to 60 mm of rain soaked the region. Since late November, precipitation excesses of 60 to 230 mm accumulated in southern Iran [5 weeks].

### 8. Zimbabwe and Mozambique:

#### **BENEFICIAL RAINS BRING RELIEF.**

Heavy showers and thundershowers yielded as much as 90 mm of rain during this fourth successive week of above normal precipitation in Zimbabwe and northern Mozambique [4 weeks].

### 9. Southeastern Australia:

#### **DRIER CONDITIONS PREVAIL IN MOST AREAS.**

Less than 20 mm of rain fell on most inland locations, but as much as 80 mm drenched the southeastern coast [Ending at 5 weeks].

### 10. Fiji Islands:

#### **CYCLONE KINA RAKES ISLANDS.**

According to the National Disaster Management Council of Fiji, Cyclone Kina was the worst storm to strike the South Pacific nation in 57 years, causing considerable damage. Daily rainfall totals approached 200 mm in parts of the islands [Episodic Event].

# UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF JANUARY 3 – 9, 1993

The first full week of the new year brought stormy weather to most of the contiguous U.S. A series of strong winter storms continued to move through the Far West, generating heavy rains and mountain snows, flooding, and mud and rock slides. Up to four inches of rain deluged portions of southern California and northwestern Mexico, causing extensive flooding and forcing evacuations. More than a dozen homes were flooded with up to four feet of water in Victorville, CA, after the Mojave River overflowed its banks, displacing dozens of people. Heavy rains and severe flooding caused up to \$27 million in damage and claimed the lives of nearly a dozen people in Tijuana, Mexico, according to press reports. In addition, 2800 people were left homeless after numerous homes were either washed away or damaged by flooding. In California, heavy snows continued to improve the mountain snowpack. According to press reports, state officials in California reported Tuesday that snowcover depths in the Sierras averaged up to seven feet deep, the most since the winter of 1984. Elsewhere, wintry conditions prevailed from the Intermountain West to the upper Midwest. Up to two feet of snow buried Salt Lake City, UT on Saturday and early Sunday (10th) while up to 40 inches blanketed the surrounding foothills. The heavy snow pushed the seasonal total to date at Salt Lake City International Airport over 59 inches, the greatest on record. Farther east, Topeka, KS observed the biggest single-storm snowfall in 93 years when over seventeen inches fell on Friday and Saturday. In sharp contrast, springlike weather prevailed from the southern Plains to the mid-Atlantic. The unusually mild conditions yielded four dozen record daily highs from Texas to Maine as readings topped 70°F as far north as West Virginia. Meanwhile, strong thunderstorms raked portions of the southern Plains, Mississippi Valley, Deep South, and Ohio Valley, dumping heavy rains and generating strong wind gusts. Resultant flooding closed numerous roads, flooded approximately 200 homes, and forced evacuations in the Midwest and Tennessee Valley, according to press reports. Elsewhere, thunderstorms packing heavy rain and a couple of tornadoes battered northern Florida on Friday. In Alaska, unusually mild conditions dominated most of the state as readings soared above freezing as far north as central parts of the state.

The week began as a low pressure center and its trailing cold front pushed into the Pacific Northwest. The storm system dumped coastal rains and heavy mountain snows as it moved eastward. Up to a foot of snow blanketed portions of the northern Intermountain West, and strong wind gusts generated blizzard-like conditions in Montana on Monday. Meanwhile, unusually cold conditions settled into the Great Basin and northern Intermountain West, producing subzero readings, including a record daily low of -24°F at Ely, NV on Sunday. Elsewhere, a strong cold front pushed slowly across the nation's midsection. Warm, moist Gulf air streamed northward ahead of the front, producing unseasonably warm weather across the eastern third of the nation. Over a dozen record daily highs were established on Monday from Texas to Ohio and more than two dozen more were set on Tuesday from the Deep South to the north Atlantic. Meanwhile, strong thunderstorms erupted along and ahead of the cold front as it tracked eastward,

dumping heavy rains and generating strong wind gusts from the southern Plains to the Ohio Valley. Over three inches of rain soaked portions of Texas, Louisiana, and Arkansas, flooding numerous roads and forcing evacuations. In Alaska, heavy snow fell on some mid-state locations, pushing season-to-date totals over 100 inches.

During the last half of the week, the cold front in the East pushed off the Atlantic Coast while the southern edge stalled over northern Florida. To the south of the front, unseasonably warm conditions prevailed, establishing record daily highs at a few locations. Meanwhile, a storm developed along the front in northern Florida and generated torrential rains and a couple of tornadoes on Friday. Farther west, another winter storm moved into California accompanied by inundating rains and heavy mountain snows. Heavy rains forced several rivers out of their banks in southern California and Arizona, flooding numerous roads and homes. Farther north, up to two feet of snow buried parts of Utah, causing avalanches in the mountains. Elsewhere, bitterly cold conditions penetrated the upper Midwest, producing subzero temperatures Saturday morning, including a low of -44°F at Roseau, MN.

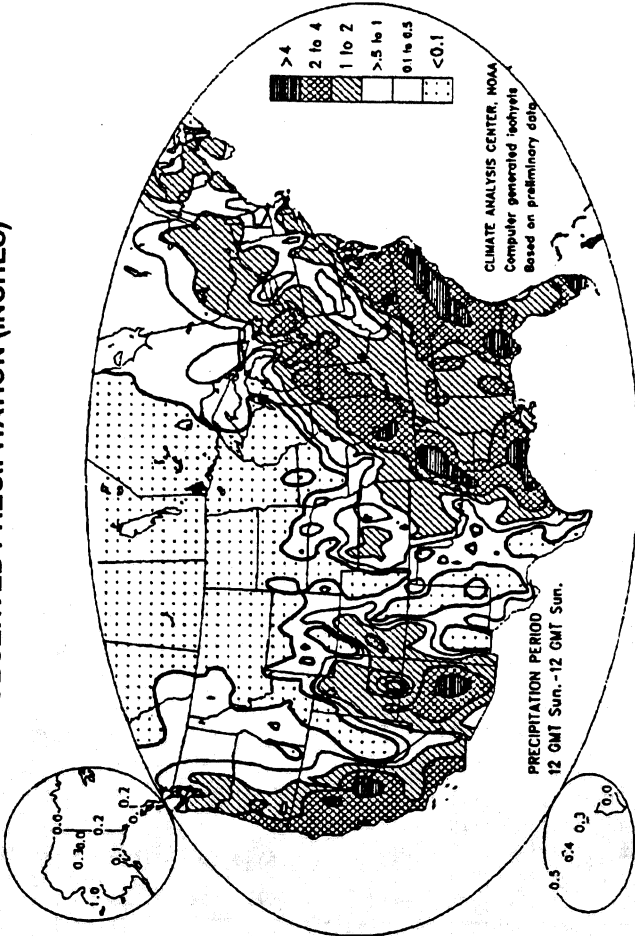
According to the River Forecast Centers, the greatest weekly precipitation totals (more than two inches) fell on the southern half of the mid-Atlantic, most of the Deep South, a band from eastern Texas northeastward to the southern Great Lakes, scattered locations in the central Rockies, across most of Arizona and California, the western halves of Oregon and Washington, and a few locations in southwestern Alaska. Light to moderate precipitation was measured across the remainders of the Atlantic states, the Ohio Valley, the Great Lakes, and southern and central Mississippi Valley as well as the central and southern Plains, the northern and central Rockies and Intermountain West, southern and central Alaska, and most of Hawaii. Little or no precipitation occurred in the upper Midwest, northern Great Plains, northern Alaska, and eastern Hawaii.

Unseasonably warm weather dominated from the Mississippi Valley eastward and across the southern Plains and Rockies. Weekly departures between +11°F and +16°F were common from Florida to northern New England while departures of +3°F to +9°F were prevalent across the remainder of the aforementioned areas. In Alaska, weekly departures above +30°F were common across the central part of the state, reaching +38°F at McGrath.

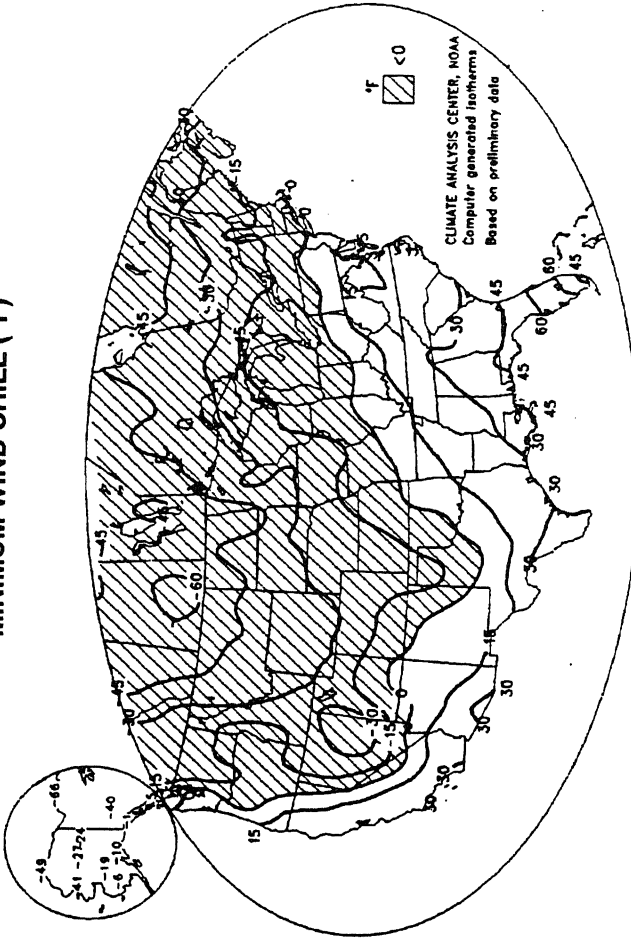
In sharp contrast, unusually cold weather occurred from the northern Plains through the northern and central Rockies and across the Far West. Weekly departures between -12°F and -18°F were recorded from the Dakotas to the Pacific Northwest while departures of -3°F to -11°F were prevalent in the central Plains and Rockies, the Great Basin, and the southern half of the Pacific Coast. In Alaska, cooler than normal conditions were confined to extreme southeastern locations, reaching -5°F at Yakutat. Abnormally cool weather also prevailed across the western Hawaiian Islands where temperatures averaged 2°F to 4°F below normal.

# UNITED STATES WEEKLY CLIMATE CONDITIONS (January 3 - 9, 1993)

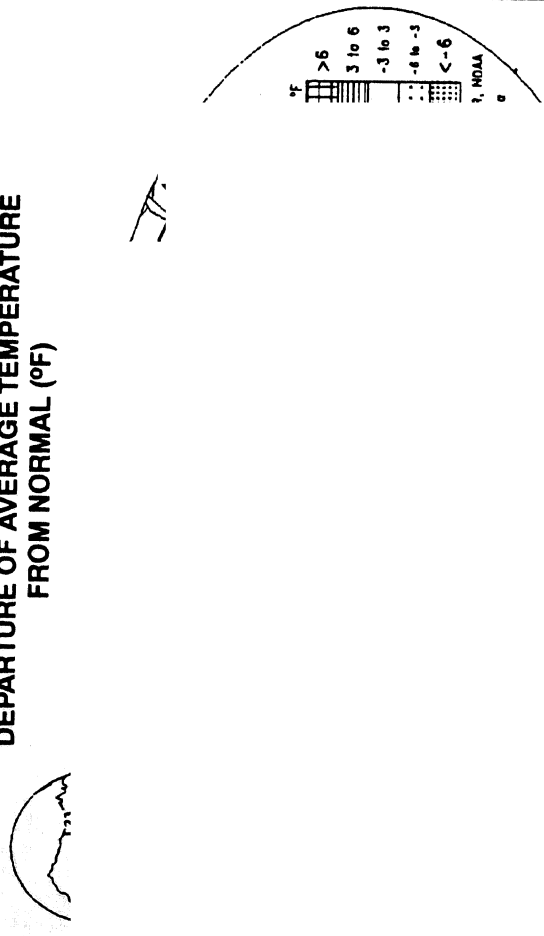
OBSERVED PRECIPITATION (INCHES)



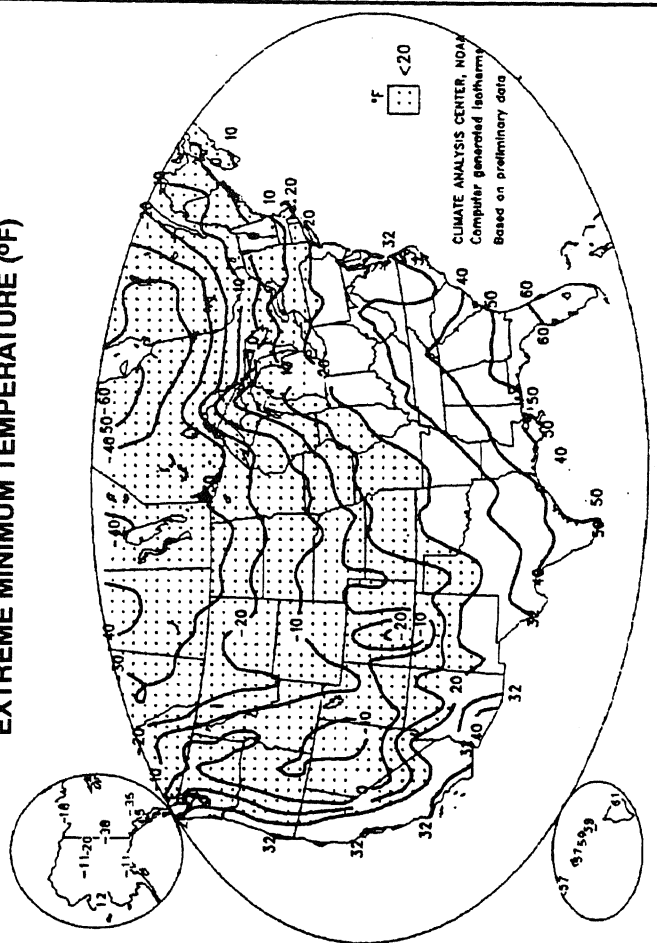
MINIMUM WIND CHILL (°F)



DEPARTURE OF AVERAGE TEMPERATURE  
FROM NORMAL (°F)

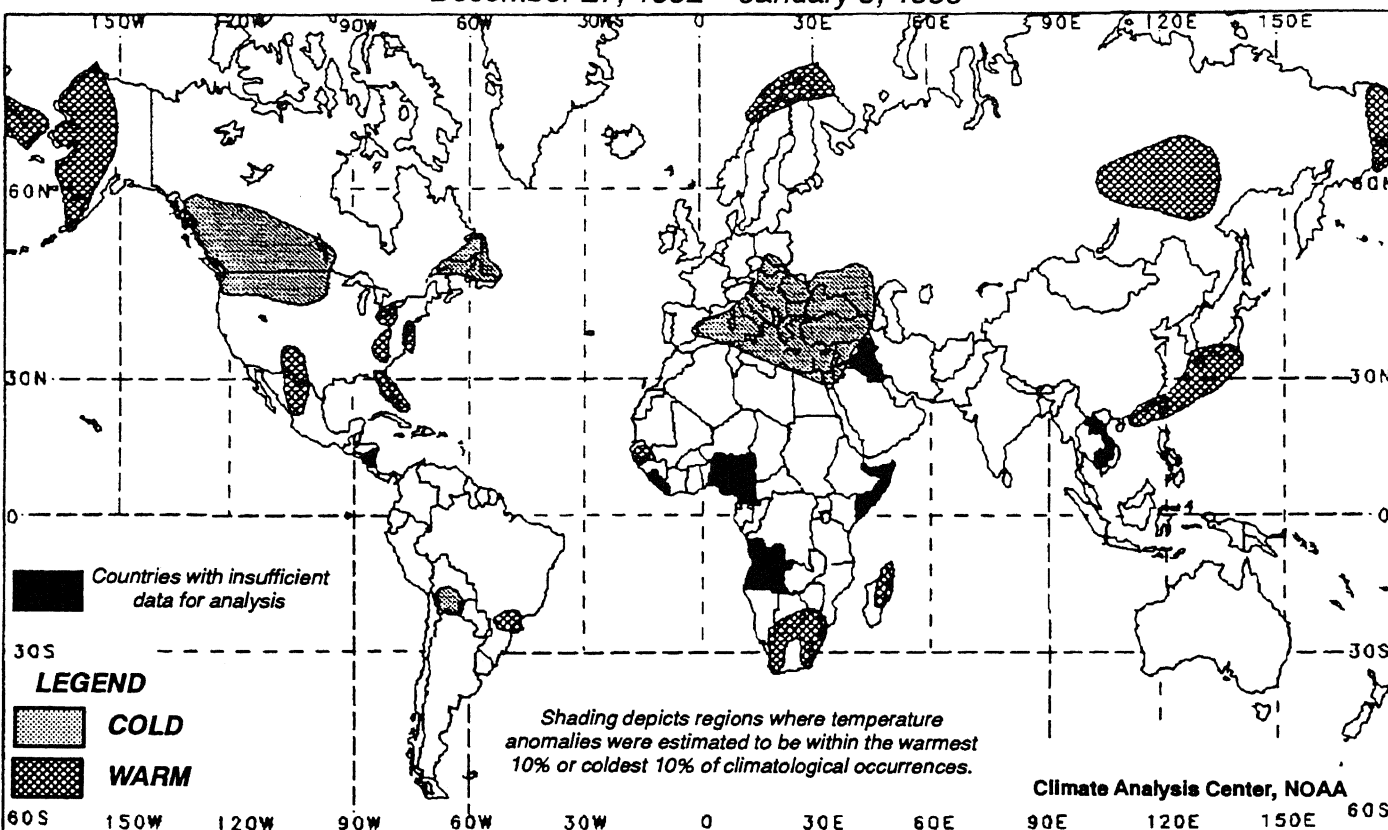


EXTREME MINIMUM TEMPERATURE (°F)



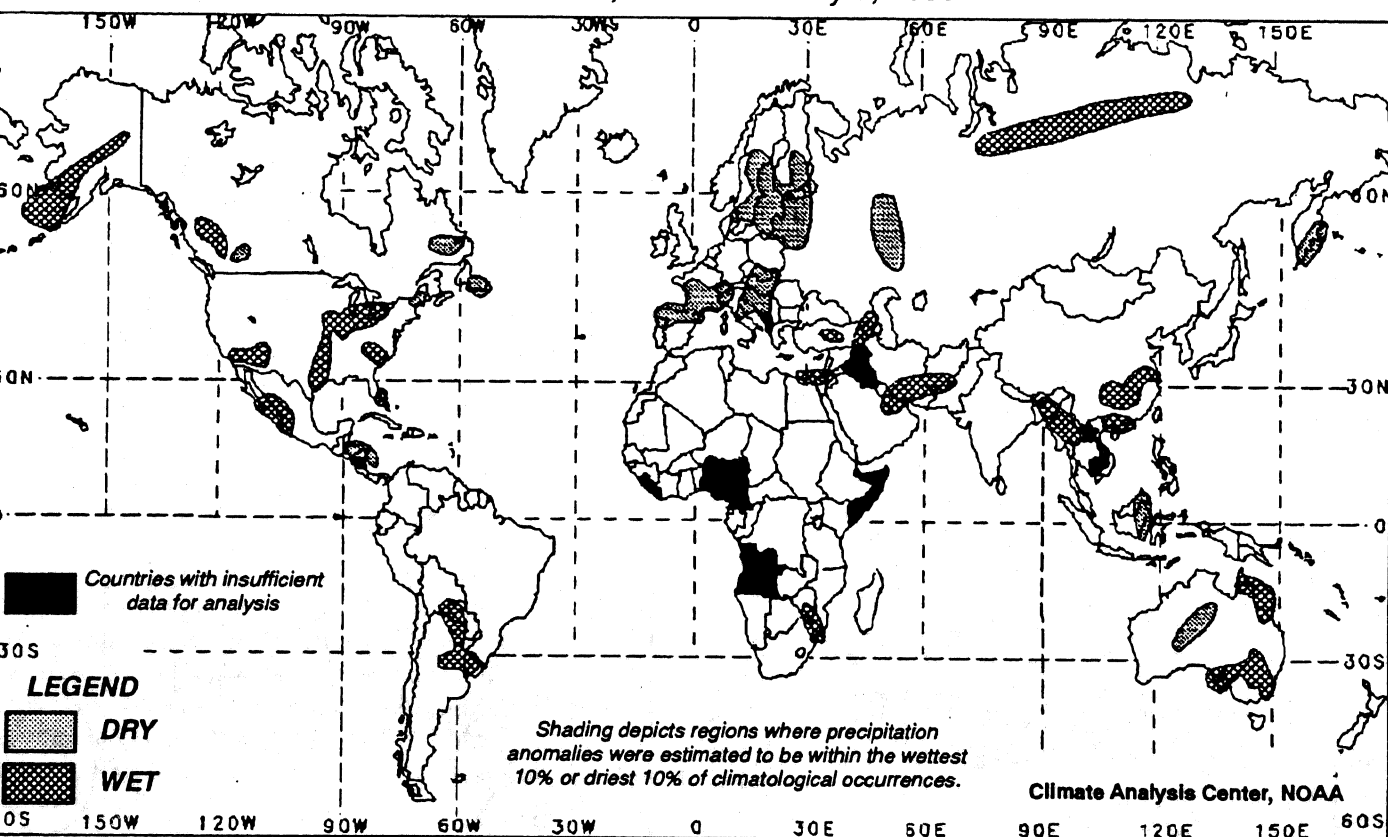
## TWO-WEEK GLOBAL TEMPERATURE ANOMALIES

December 27, 1992 – January 9, 1993



## FOUR-WEEK GLOBAL PRECIPITATION ANOMALIES

December 13, 1992 – January 9, 1993



## SPECIAL CLIMATE UPDATE

### RECENT HEAVY PRECIPITATION AND LONG-TERM DROUGHT CONDITIONS ACROSS THE FAR WEST

*Analysis and Information Branch, Climate Analysis Center  
National Meteorological Center, National Weather Service  
NOAA*

Precipitation typically falls in a very distinct pattern across the western United States. Very dry conditions are usually observed from late spring into autumn, with the bulk of the annual precipitation observed during November – March. During this period, ample precipitation and the development of a deep mountain snowpack are necessary for the region to have sufficient water supplies throughout the year. Unfortunately, below normal totals have been observed across large portions of the Far West through each of the last six “wet seasons” (1986/87 – 1991/92). Accumulated deficits of 1000 – 1800 mm accumulated across much of the Sierra Nevadas, Cascades, northwestern California, and the western halves of Washington and Oregon during this period. In addition, the considerably smaller shortages recorded across southern California and Nevada are somewhat misleading for two reasons: 1) These areas get much of their water from other sections of the Far West, where drought conditions have been more acute, and 2) Summertime thunderstorms have dropped heavy rainfall in short periods of time, and much of this precipitation runs off before it can be absorbed into the ground, thus providing little useful water. It should be noted that although much of the attention has been focused on northern California and the Sierra Nevadas, and appropriately so, the 1991/92 wet season was actually driest across the northern Great Basin, extreme northern California, and southern Oregon. As of December 1, 1992, reservoirs across interior southwestern Oregon held only 12% of normal reserves for that date, according to the Oregon State Climatologist.

October 1992 brought a quick start to the wet season to most of the Far West, although totals were small compared to those normally observed later in the season. November, unfortunately, was quite dry at most locations. According to the California State Dept. of Water Resources, only 20% of normal November precipitation fell statewide while somewhat larger amounts were reported farther north. Beginning in early December, however, a series of storms brought heavy rains and snows (depending on elevation) to the Far West, especially the Sierra Nevadas and Cascades. Figure 1 compares the precipitation totals that were measured from the beginning of the 1992/1993 wet season through December 5 vs. those reported Dec. 6, 1992 – Jan. 10, 1993. In the short-term, these storms were a hindrance, forcing the closure of numerous mountain roads and halting rail travel in some areas. Additionally, parts of extreme southern California and northwestern Mexico were afflicted by severe flooding, particularly in the vicinity of San Diego and Tijuana. In the long-term, however, these storms should prove very beneficial, not only because of the moisture that they provided, but because they were very cold systems, dropping a larger relative proportion of their precipitation as snow than would typical disturbances. Figures 2 and 3 show the 1992/1993 wet season percent of normal precipitation reported in selected river basins across the Far West as of January 1, and the percent of normal snow water equivalent for the same basins as of January 1. Most locations outside of Washington have received abundant precipitation, and snow water equivalents show even larger surpluses. In Washington, precipitation totals are below normal at many locations, but snow water equivalents are at or above normal since an unusually large proportion of the precipitation fell as snow. Across the snow water equivalent was 140% – 145% of normal on January 1. Please note that, although wet season totals to date are only 48% of the normal total seasonal precipitation (October through the following September) had fallen in California during the year, according to the California State Dept. of Water Resources. Therefore, more timely action is needed for the region to avoid a seventh year of drought.

Through January 1, wet-season precipitation totals across California are identical to the identical period during the last 8 seasons, including what has been termed the “drought” years. These conditions are more hopeful for significant drought relief this year than during the previous years. However, as of January 1 may not continue through the remainder of the wet season. Figure 5 shows that reservoir storages are not necessarily reflective of recent rains and snows, reservoir storages at California’s primary reservoirs (as of January 1, 1992 and 1991). This is a result of the “coldness” of the storms, which limits the improvement in the state’s water supply provided by these storms. As snow water starts to flow into the reservoirs, which typically occurs in late winter, the improvement in the state’s water supply is similar in that state. Mountain snowpack is encouraging, but conditions remain critically low in some areas, although they should improve once the snow melts.

Figures 6 and 7 put the recent precipitation reported through California in context with the long-term precipitation total reported statewide, but also note that similarly large drought conditions, and that in the end the wet spells did not continue for long. The 1992/93 is the first wet season to bring above normal precipitation since 1977/78. This provides limited widespread benefits and providing the possibility of significant improvement in the state’s water supply for the next few months.

Figure 1.

## TOTAL PRECIPITATION (IN)

October 1 – December 5, 1992

December 6, 1992 – January 10, 1993

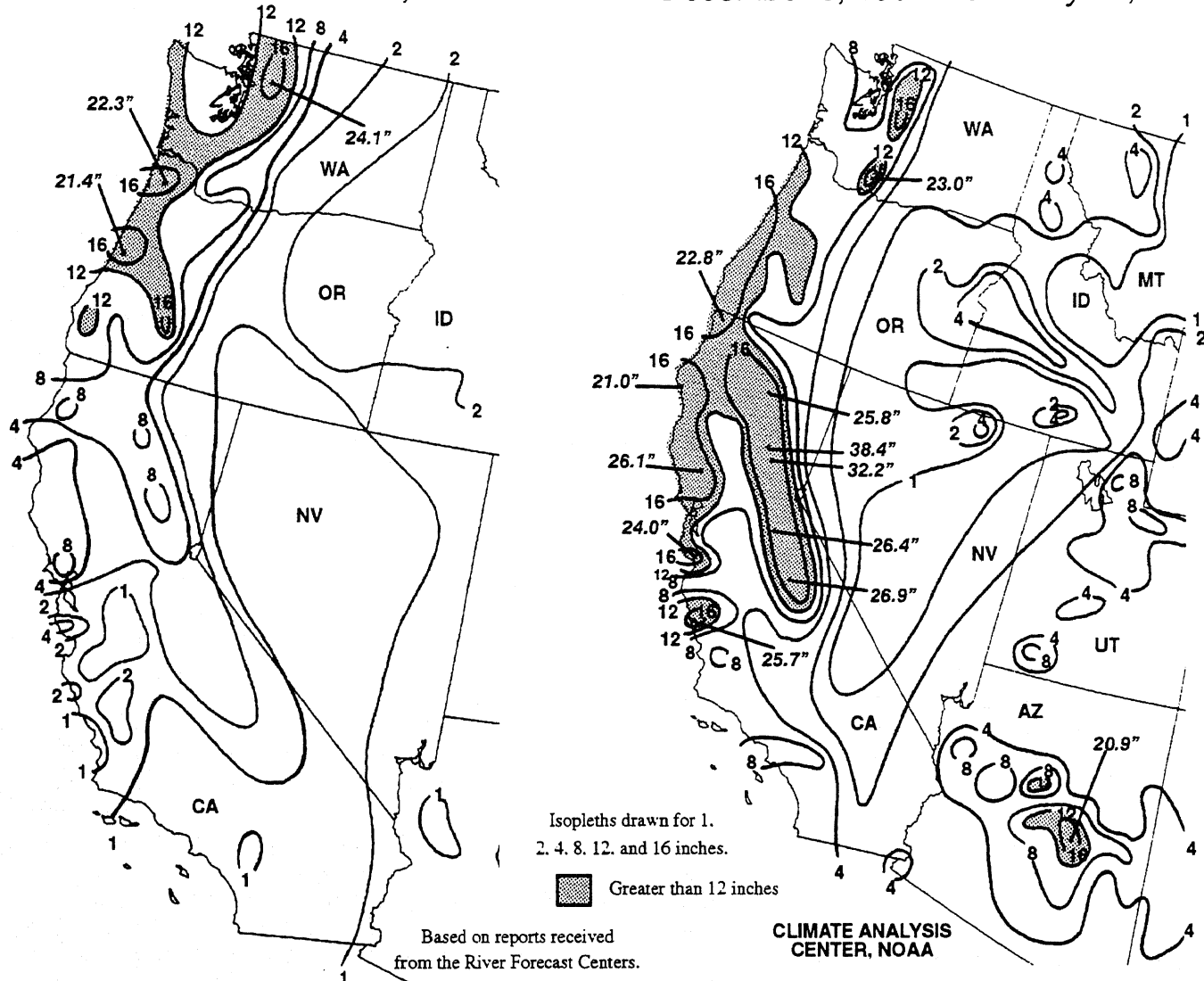


Figure 2.

## PERCENT OF NORMAL PRECIPITATION

Selected River Basin Averages, October 1, 1992 – January 8, 1993

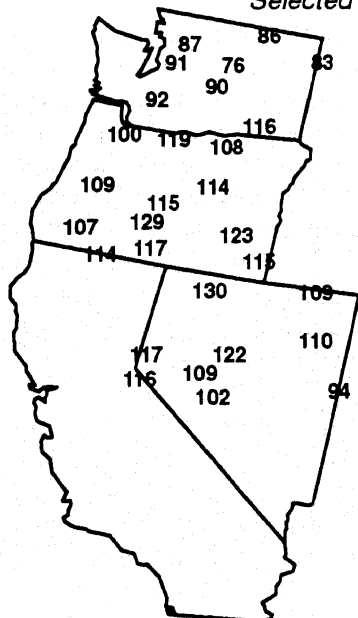
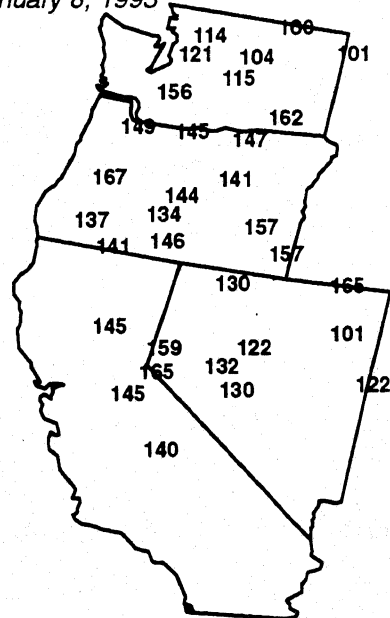


Figure 3.

## PERCENT OF NORMAL SNOW WATER EQUIVALENT

Selected River Basin Averages, October 1, 1992 – January 8, 1993

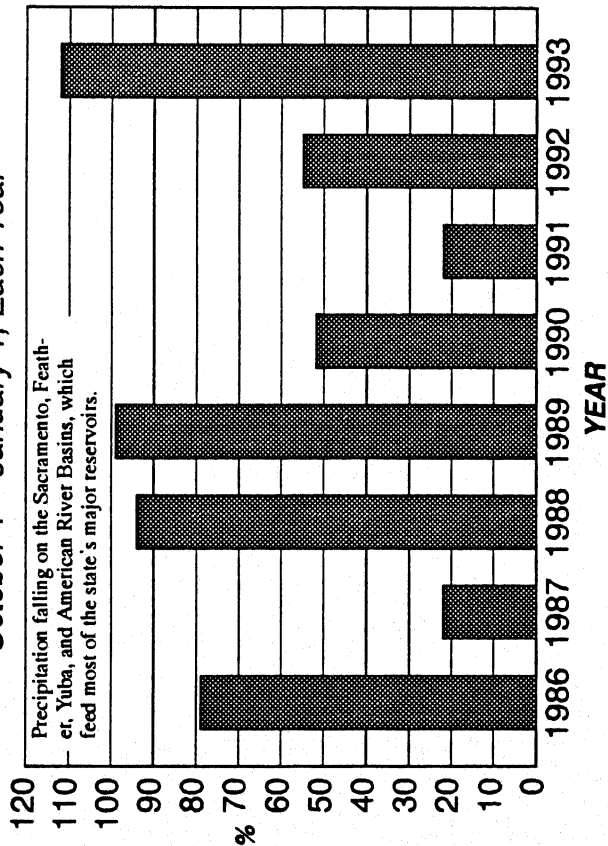


SOIL CONSERVATION SERVICE, USDA

STATE OF CALIFORNIA  
DEPT. OF WATER RESOURCES

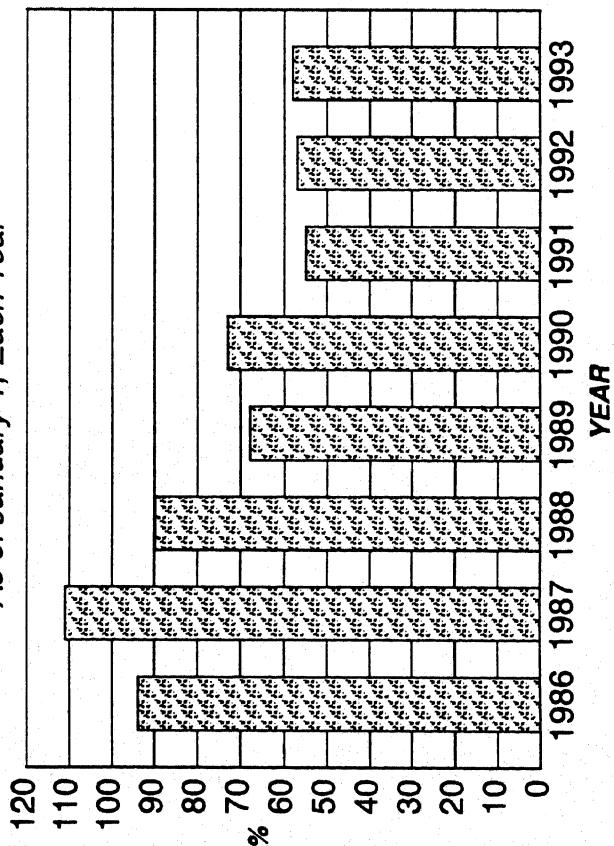


**Figure 4. PERCENT OF NORMAL PRECIPITATION  
ACROSS NORTHERN CALIFORNIA  
October 1 – January 1, Each Year**



**Figure 5.**

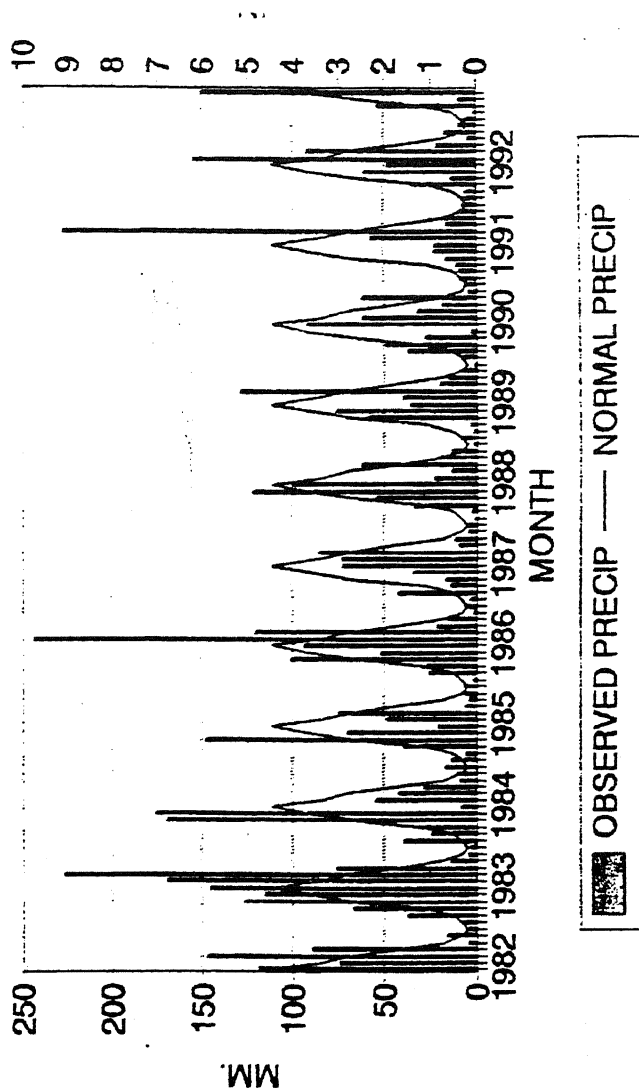
**PERCENT OF NORMAL RESERVOIR STORAGE  
FOR THE 155 PRIMARY CALIFORNIA RESERVOIRS  
As of January 1, Each Year**



STATE OF CALIFORNIA DEPT. OF WATER RESOURCES

**Figure 6.**

**TOTAL VS. NORMAL PRECIPITATION BY MONTH  
CALIFORNIA STATEWIDE AVERAGE  
January 1982 – December 1992**



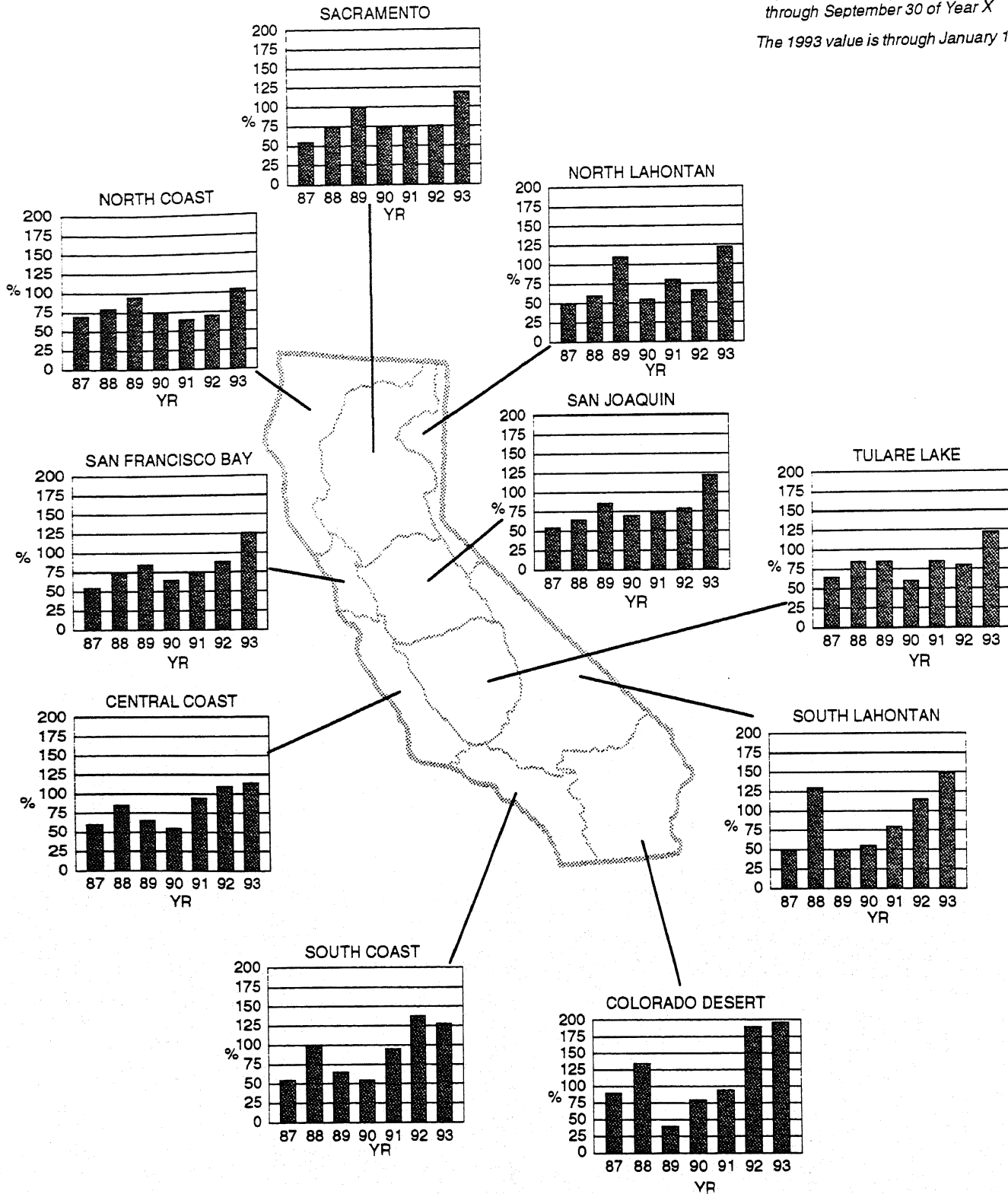
NATIONAL CLIMATIC DATA CENTER, NOAA

Figure 7.

# PERCENT OF NORMAL PRECIPITATION ACROSS CALIFORNIA AVERAGED BY HYDROLOGIC REGION

For Each Water Year 1987 – 1993

NOTE: Water Year X is defined as  
October 1 of the previous year  
through September 30 of Year X  
The 1993 value is through January 1.



# EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC ADVISORY 93/01

ISSUED BY

## DIAGNOSTICS BRANCH CLIMATE ANALYSIS CENTER, NMC

January 12, 1993

The combination of long-lived positive sea surface temperatures (SST) anomalies, the normal progression of the annual cycle, and seasonal intraseasonal oscillation has resulted in the strengthening of ENSO-like conditions in December 1992.

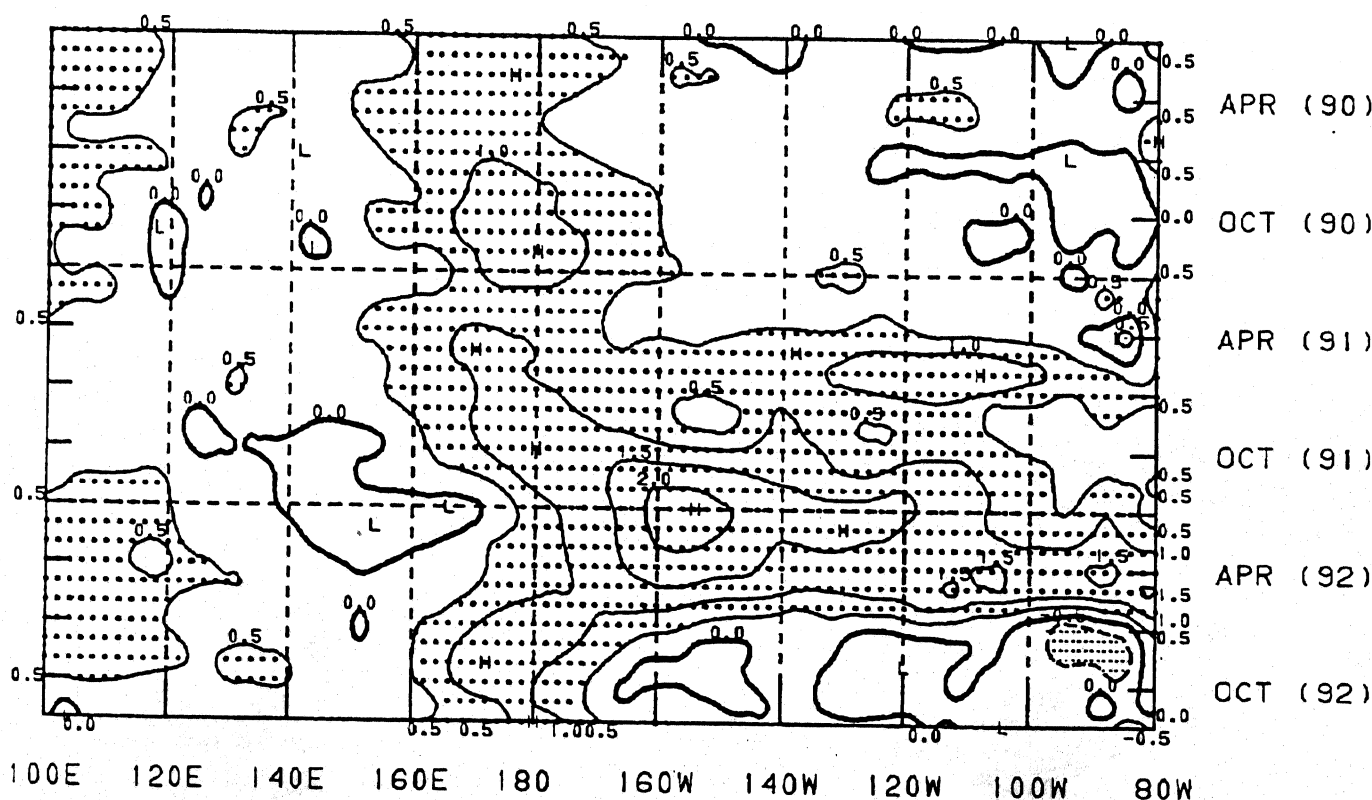
The 1991-92 ENSO episode has been unique in its evolution. Positive sea surface temperature (SST) anomalies developed in the western equatorial Pacific in late 1989 along with the enhanced convection in the western equatorial Pacific. However it wasn't until mid-1991 that a fledged warm (ENSO) episode began to evolve. Mature warm episode conditions were observed during the period December 1991 - May 1992 with drought in Indonesia, northern Australia, the Philippines and southern Africa. At the same time, excessive rainfall affected the southern United States, northern Mexico and central South America. Positive SST anomalies in the eastern equatorial Pacific began decreasing rapidly in late May and conditions returned to near normal in the tropical Pacific by July. However, weak warm episode-like positive SST anomalies continued to be observed in subsequent months, as positive SST anomalies persisted in the central equatorial Pacific, low-level equatorial easterlies remained weaker than normal and the Southern Oscillation Index (SOI) remained negative.

In December, the anomalous patterns of the sea surface temperature (SST), low-level winds, sea level pressure and atmospheric convection [outgoing longwave radiation (OLR)] indicate that warm episode conditions have strengthened in the tropical Pacific. This evolution is consistent with expectations based on experimental prediction techniques and the evolution of previous warm episodes.

During December the oceanic thermocline deepened substantially in the central and eastern equatorial Pacific, and remained shallow in the western equatorial Pacific. Additionally, the low-level easterlies remained weaker than normal throughout the equatorial Pacific for the second consecutive month, sea surface temperatures remained anomalously warm in the central equatorial Pacific (Fig. 1) and convective activity intensified along the equator near the date line (Fig. 2). All of these features are consistent with a return to warm episode conditions in the tropical Pacific.

The deepening of the oceanic thermocline, which has been evident since November, has shown an eastward progression with time (Fig. 3). If this trend continues, a deepening of the thermocline is likely to be observed along the west coast of South America (Ecuador and Peru) during late January, which would result in El Niño conditions in the region, contrary to present indications of cooler than normal conditions.

The normal seasonal trends at this time of year favor a continuation of warm episode conditions during the first months of 1993.



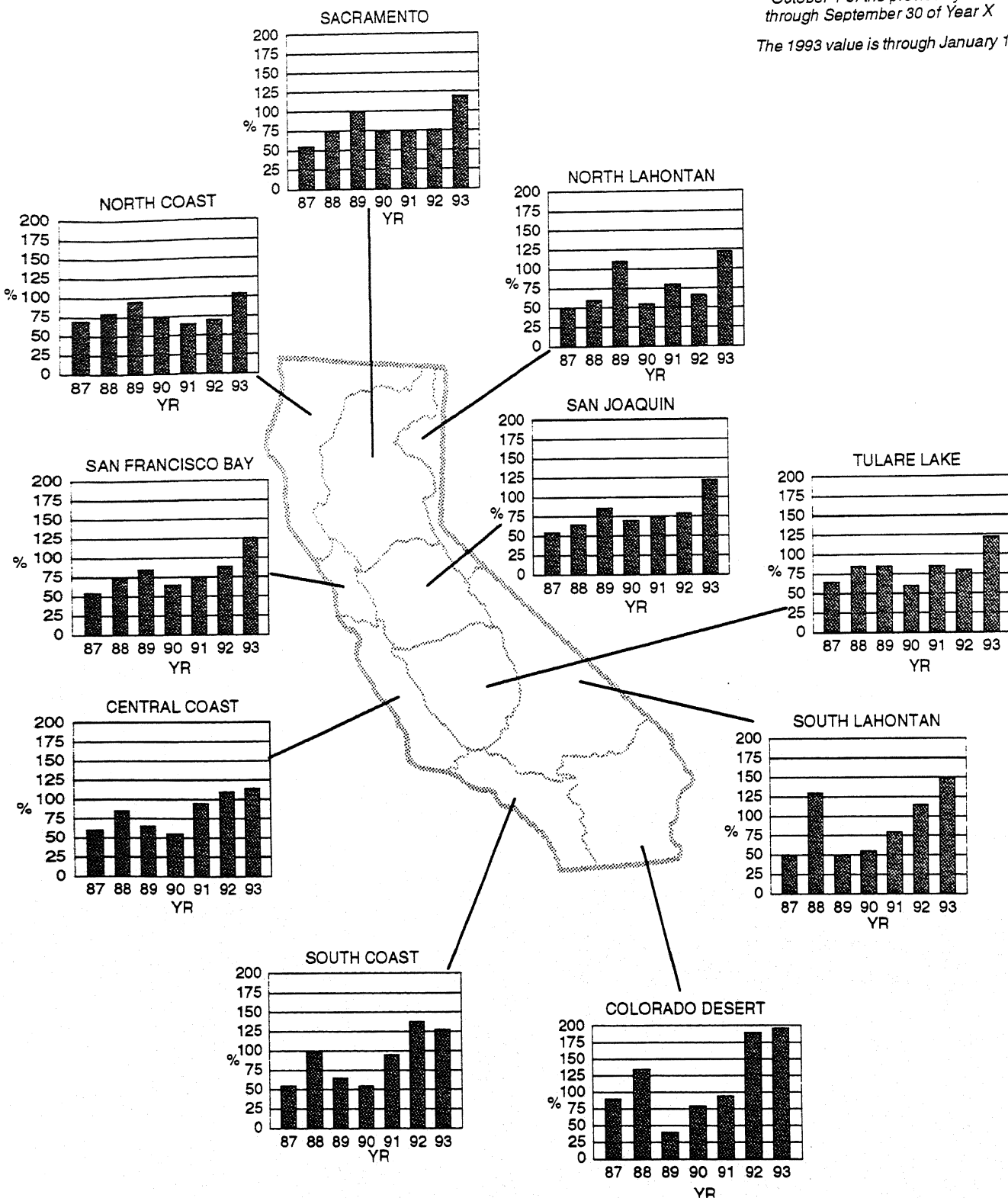
**Figure 1.** Time-longitude section of equatorial sea surface temperature anomalies in the Pacific. Contour interval is 0.5°C. Negative (positive) values are indicated by shading (stippling).

Figure 7.

# PERCENT OF NORMAL PRECIPITATION ACROSS CALIFORNIA AVERAGED BY HYDROLOGIC REGION

For Each Water Year 1987 – 1993

NOTE: Water Year X is defined as  
October 1 of the previous year  
through September 30 of Year X  
The 1993 value is through January 1.



# EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC ADVISORY 93/01

ISSUED BY

## DIAGNOSTICS BRANCH CLIMATE ANALYSIS CENTER, NMC

January 12, 1993

The combination of long-lived positive sea surface temperatures (SST) anomalies, the normal progression of the annual cycle, and seasonal intraseasonal oscillation has resulted in the strengthening of ENSO-like conditions in December 1992.

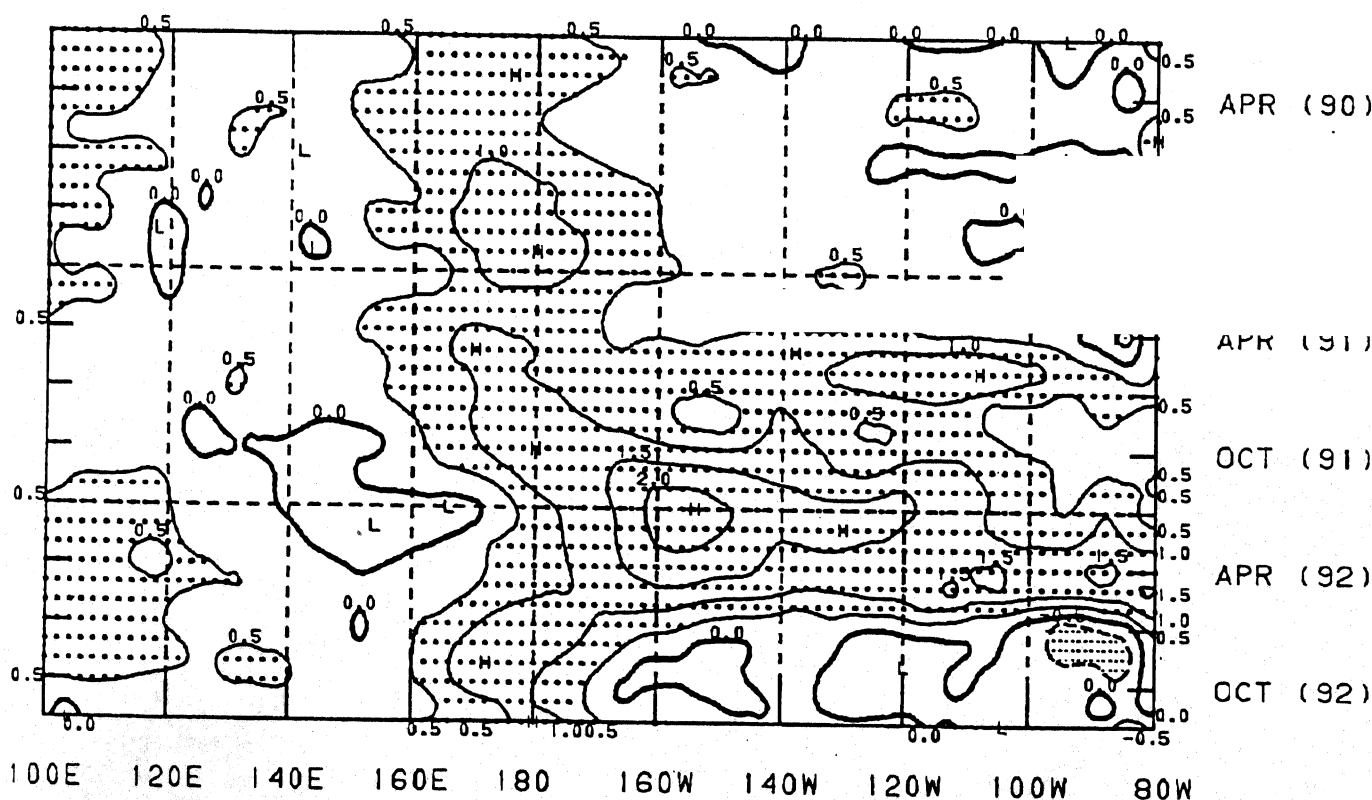
The 1991-92 ENSO episode has been unique in its evolution. Positive sea surface temperature (SST) anomalies developed in the western equatorial Pacific in late 1989 along with the enhanced convection in the western equatorial Pacific. However it wasn't until mid-1991 that a fledged warm (ENSO) episode began to evolve. Mature warm episode conditions were observed during the period December 1991 - May 1992 with drought in Indonesia, northern Australia, the Philippines and southern Africa. At the same time, excessive rainfall affected the southern United States, northern Mexico and central South America. Positive SST anomalies in the eastern equatorial Pacific began decreasing rapidly in late May and conditions returned to near normal in the tropical Pacific by July. However, weak warm episode-like positive SST anomalies continued to be observed in subsequent months, as positive SST anomalies persisted in the central equatorial Pacific, low-level equatorial easterlies remained weaker than normal and the Southern Oscillation Index (SOI) remained negative.

In December, the anomalous patterns of the sea surface temperature (SST), low-level winds, sea level pressure and atmospheric convection [outgoing longwave radiation (OLR)] indicate that warm episode conditions have strengthened in the tropical Pacific. This evolution is consistent with expectations based on experimental prediction techniques and the evolution of previous warm episodes.

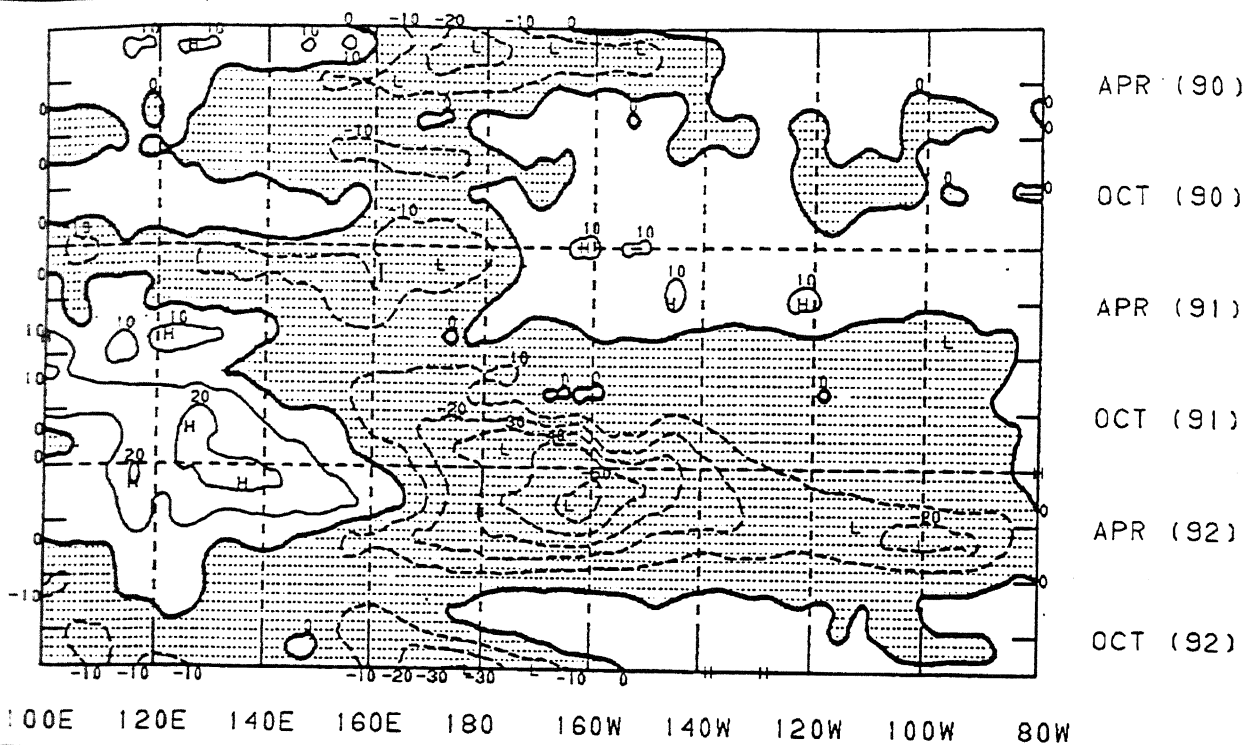
During December the oceanic thermocline deepened substantially in the central and eastern equatorial Pacific, and remained shallow in the western equatorial Pacific. Additionally, the low-level easterlies remained weaker than normal throughout the equatorial Pacific for the second consecutive month, sea surface temperatures remained anomalously warm in the central equatorial Pacific (Fig. 1) and convective activity intensified along the equator near the date line (Fig. 2). All of these features are consistent with a return to warm episode conditions in the tropical Pacific.

The deepening of the oceanic thermocline, which has been evident since November, has shown an eastward progression with time (Fig. 3). If this trend continues, a deepening of the thermocline is likely to be observed along the west coast of South America (Ecuador and Peru) during late January, which would result in El Niño conditions in the region, contrary to present indications of cooler than normal conditions.

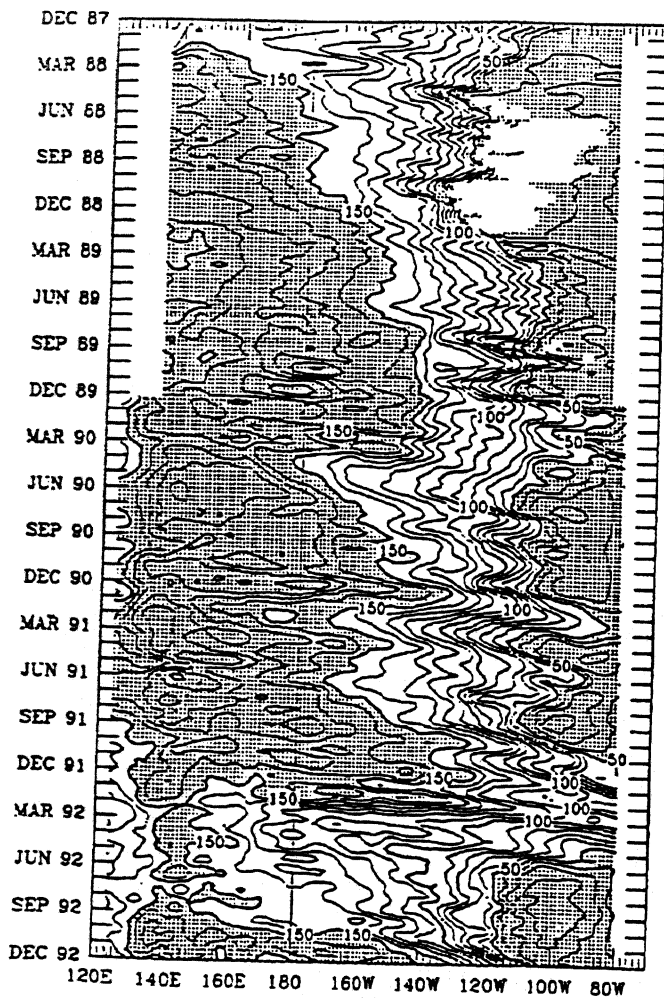
The normal seasonal trends at this time of year favor a continuation of warm episode conditions during the first months of 1993.



**Figure 1.** Time-longitude section of equatorial sea surface temperature anomalies in the Pacific. Contour interval is 0.5°C. Negative (positive) values are indicated by shading (stippling).



**Figure 2.** Time-longitude section of outgoing longwave radiation (OLR) anomalies in the tropical Pacific (5°N–5°S). Contour interval is 10 Wm<sup>-2</sup>.



**Figure 3.** Depth of the 20°C isotherm along the equator in the Pacific Ocean. Data are derived from an analysis system which assimilates oceanic observations into an oceanic GCM. The contour interval is 10m with shading for values less than 50m and also for values greater than 150m.

# UNITED STATES MONTHLY CLIMATE SUMMARY

## DECEMBER 1992

The beginning of December was marked by heavy snow across much of the Northeast and West and unusually cold conditions for most of the country. A storm system off the north Atlantic Coast intensified rapidly, dumping heavy snow from the central Appalachians to northern New England. Farther west, blizzard-like conditions battered portions of the Rockies. The first week of the month ended with a blast of frigid Arctic air penetrating as far south as southern California and northern Florida, with temperatures down to  $-22^{\circ}\text{F}$  in Idaho and Wyoming. More than a dozen daily record lows were established from California to Iowa. In sharp contrast, unusually mild weather covered Alaska, as readings topped  $32^{\circ}\text{F}$  at Nome. In Hawaii, more than seven inches of rain inundated Hilo, Hawaii in one day.

Early in the following week, a strong Pacific storm moved into southern California, accompanied by high wind and heavy precipitation that flooded some freeways and homes, but provided much-needed moisture in the mountains. This system eventually helped fuel a fierce Nor'easter that pounded the Northeast and mid-Atlantic later in the week. Heavy snow buried much of the central and northern Appalachians and inland areas of southern New England, and record high tides, strong winds, and torrential rains pounded the Atlantic Coast from Virginia to Massachusetts. Onshore winds of up to 90 mph helped generate some of the highest tides of the century and combined with the heavy rains to cause major coastal flooding and beach erosion from Maryland northward to Cape Cod. The storm left highways submerged while subway, train, and airport services were suspended. Electrical power was interrupted for over one-hundred thousand customers. Farther north and west, over two feet of snow buried many locations from West Virginia northeastward into Connecticut and Massachusetts, resulting in several 24-hour snowfall records. Over forty inches accumulated on part of northwestern Maryland, establishing a new statewide single-storm record.

The nation's midsection bore the brunt of winter weather during the third week of the month. Up to a foot of rain inundated parts of the middle Red River Valley and western Ozarks, sending rivers out of their banks and forcing the closure of numerous roads. As much as ten inches of snow buried west-central Kansas and the Texas panhandle while freezing rain from central Oklahoma northward to the western Great Lakes hindered traffic and forced schools to close. As the storm system moved east, severe thunderstorms erupted from the central Gulf Coast to the southern Appalachians. Meanwhile, stormy weather afflicted the northern Pacific seaboard, and snow blanketed the northern tier of states from the Rockies to the upper Great Lakes.

The last full week of December featured a blast of bitterly cold Arctic air that produced some of the lowest temperatures of the season in many parts of the contiguous United States. Subzero readings were observed from the upper Midwest to the Great Basin, and nearly a dozen new daily record lows were established. Meanwhile, another Pacific storm dropped over a foot of snow on the mountains of the Northwest. Farther east, lake-effect snow squalls dumped one to two feet of snow on parts of western New York State, northwestern Pennsylvania, and lower Michigan. In contrast to the mild weather of early December, Alaska endured bitterly cold conditions, with temperatures below  $-50^{\circ}\text{F}$  and strong wind gusts generating wind chills near  $-80^{\circ}\text{F}$  in north-central parts of the state. In sharp contrast, warm and wet weather remained entrenched across the Hawaiian Islands. The mercury soared to  $90^{\circ}\text{F}$  at Kahului, Maui while nine inches of rain inundated Lihue, Kauai. In addition, readings topped  $80^{\circ}\text{F}$  in northern Florida, establishing a few daily record highs.

Fierce winter storms battered much of the nation from northern California and the Pacific Northwest to the upper Mississippi Valley during the week between the holidays at the end of the month. Yet another in the series of storms battering the West brought high winds, heavy snow, freezing rain, and low temperatures that forced the closure of major highways and rail service from Seattle, WA to St. Paul, MN. The Sierra Nevadas experienced their worst storm in several years as more than eleven feet of snow buried some of the highest elevations. The heavy precipitation was highly beneficial in pushing the mountain snowpack across California to above normal levels, but state water officials said that additional precipitation is needed to prevent a seventh year of drought, since only about half of normal statewide wet-season (October - April) precipitation had fallen by the end of the month.

According to the River Forecast Centers, heavy precipitation (over 24 inches) inundated the Far West and scattered parts of Arizona, the south-central states, and the southern Appalachians (Page 12). In addition, two or more inches fell on most of the eastern half of the country and much of the Intermountain West, except for the Great Basin. Although totals were below two inches, new monthly records were established at Bakersfield, CA and International Falls, MN (Page 13). In Alaska, precipitation totals ranged from two to fourteen inches along the southern and southeastern coasts. Above normal precipitation also dominated the Hawaiian Islands with up to 22 inches falling on Lihue, Kauai. Based on preliminary calculations from the National Climatic Data Center (NCDC), 10 of the nation's nine regions reported above median precipitation with the Southwest experiencing the 8<sup>th</sup> wettest December since records began in 1895 (Page 13). Across the 48 contiguous states as a whole, December 1992 ranked as the 26<sup>th</sup> wettest such month.

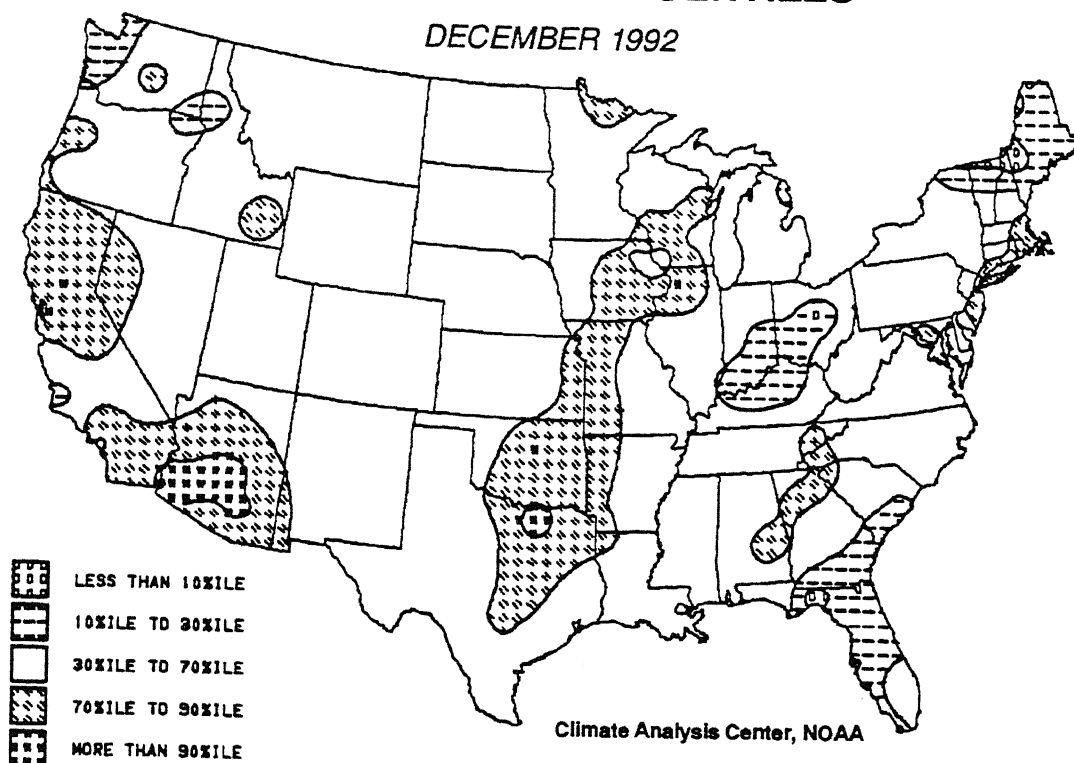
Subnormal precipitation was limited to the Great Basin, the northern High Plains, and the upper Ohio Valley (Page 12). Totals were generally below two inches in the Great Basin and the High Plains. In addition, much of Ohio received less than two inches during the month. Only three NCDC regions reported median to slightly above median precipitation totals.

An abnormally cold December covered much of the country, with departures below  $-10^{\circ}\text{F}$  in the north of the Southwest and in north-central Wyoming. Precipitation, slightly below normal, was reported in the southern Appalachians as 40% below normal in the



## PRECIPITATION PERCENTILES

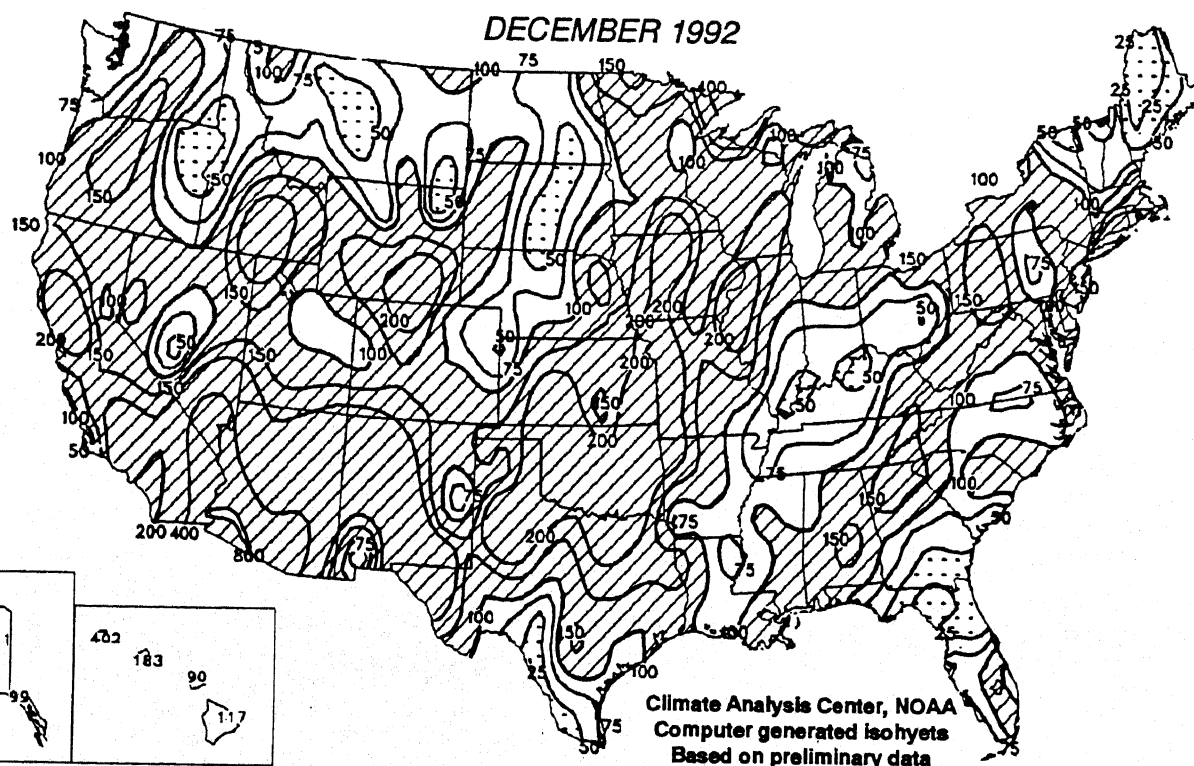
DECEMBER 1992



**FIGURE 1.** December 1992 Precipitation Percentiles. A wet month ( $>70\%$ ile) was observed in parts of the Far West and in the Great Plains from northern Texas to northeastern Wisconsin, with totals among the wettest 10% of the historical (1951–1980) distribution recorded in southern Arizona and north-central Texas. Climatologically significant dryness ( $<30\%$ ile) was limited to scattered sections of the Pacific Northwest, the Ohio Valley, northern New England, and the southern Atlantic Coast.

## PERCENT OF NORMAL PRECIPITATION

DECEMBER 1992



**FIGURE 2.** December 1992 Percent of Normal Precipitation. Hatched areas received above normal precipitation, and dotted areas reported under half of normal. Near to above normal precipitation dominated most of the country, except the northern Rockies, the Ohio and lower Mississippi Valleys, northern New England, and parts of the Southeast. Unusually low amounts were restricted to northeastern Oregon, central Montana, central South Dakota, Maine, northern Florida, and southern Georgia.



**TABLE 1. RECORD DECEMBER PRECIPITATION**

<u>STATION</u>	<u>TOTAL (IN)</u>	<u>NORMAL (IN)</u>	<u>PCT. OF NORMAL</u>	<u>RECORD TYPE</u>	<u>RECORDS BEGAN</u>
Bakersfield, CA	1.81	0.63	287.3	HIGHEST	1938
International Falls, MN	1.70	0.92	184.7	HIGHEST	1939

NOTE: Trace precipitation is considered ZERO precipitation. Stations with no precipitation are only included if normal precipitation is 0.25 inches or more.  
----- Percent of normal not calculable.

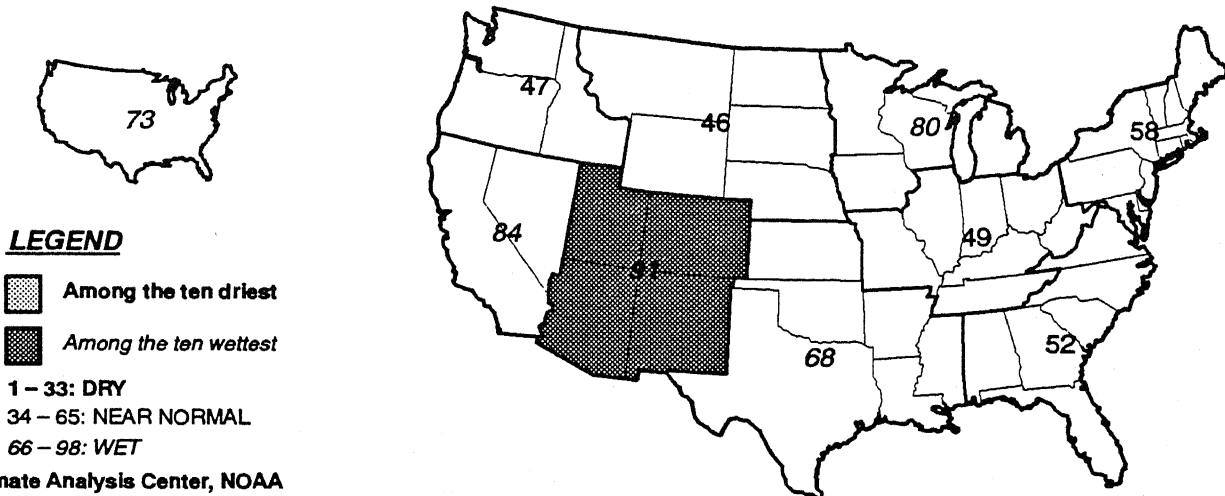
**TABLE 2. RECORD DECEMBER AVERAGE TEMPERATURES**

<u>STATION</u>	<u>DEPARTURE (°F)</u>	<u>AVERAGE (°F)</u>	<u>NORMAL (°F)</u>	<u>RECORD TYPE</u>	<u>RECORDS BEGAN</u>
Honolulu, Oahu, HI	+2.9	76.8	73.9	HIGHEST	1883

**TABLE 3. RECORD DECEMBER EXTREME TEMPERATURES**

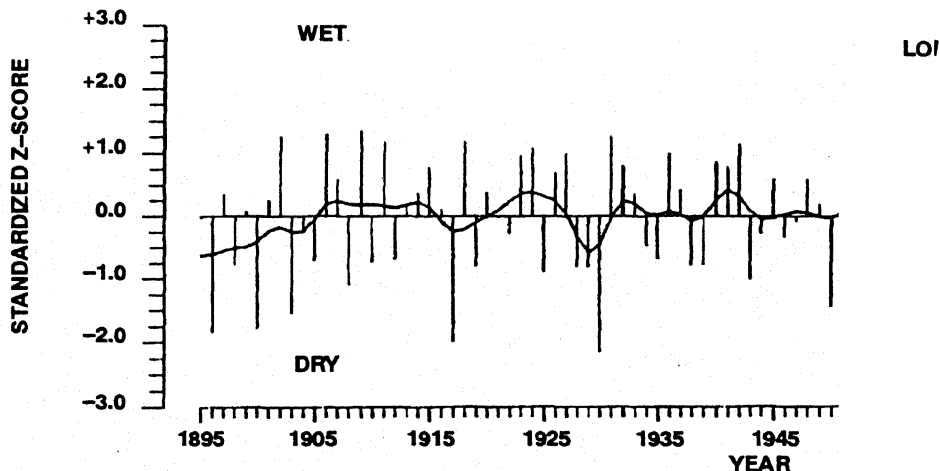
<u>STATION</u>	<u>EXTREME (°F)</u>	<u>DATE OCCURRED</u>	<u>RECORD TYPE</u>	<u>RECORDS BEGAN</u>
Anchorage, AK	48	December 2	HIGHEST	1943

## HISTORICAL PRECIPITATION RANKINGS BY REGION AND NATION DECEMBER 1992



Based on preliminary data generated by the National Climatic Data Center  
This chart depicts the ranking of the specific parameter, as measured during the period indicated, with respect to all other such periods on record since 1895.

## U. S. NATIONAL NORMALIZED PRECIPITATION INDEX DECEMBER 1895 - 1992



NATIONAL DECEMBER PRECIPITATION INDEX, as computed by the National Climatic Data Center. This index takes local normals into account so that regions with large precipitation have a greater influence on the index.

# TEMPERATURE PERCENTILES

DECEMBER 1992

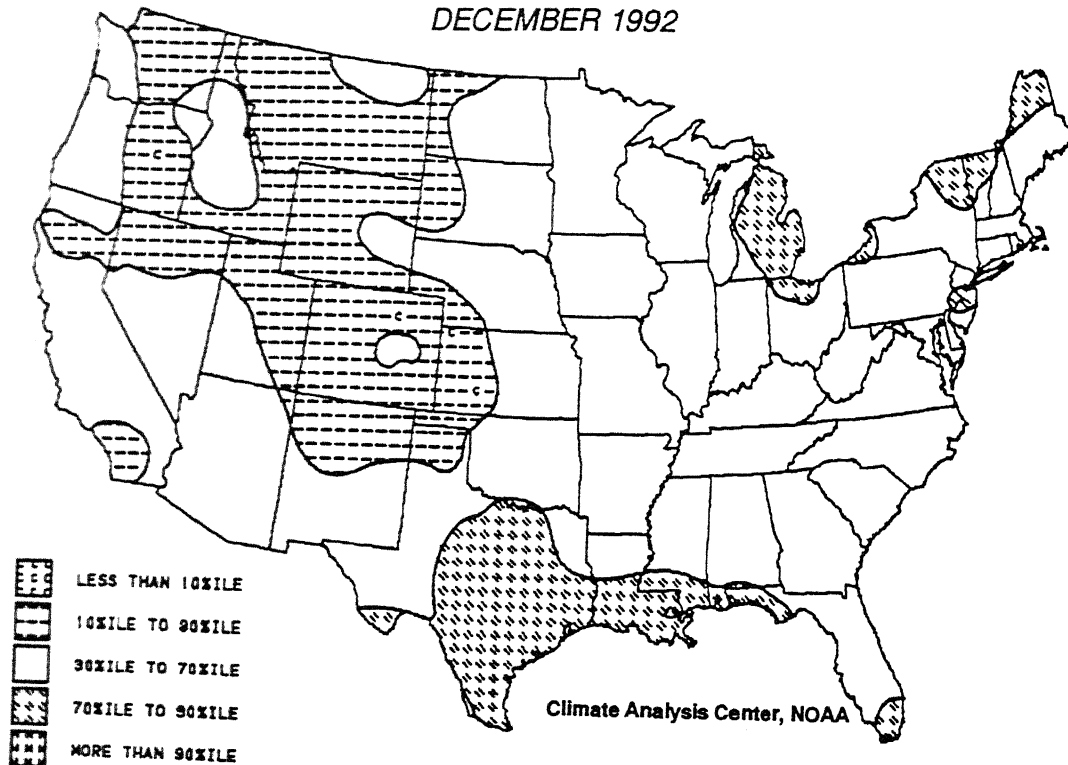


FIGURE 3. December 1992 Temperature Percentiles. Abnormally cold weather (<30%ile) dominated the western states and High Plains. In contrast, unseasonably mild conditions prevailed across Texas and the central Gulf Coast. In addition, the eastern Great Lakes and northern New England were unusually warm.

# DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

DECEMBER 1992

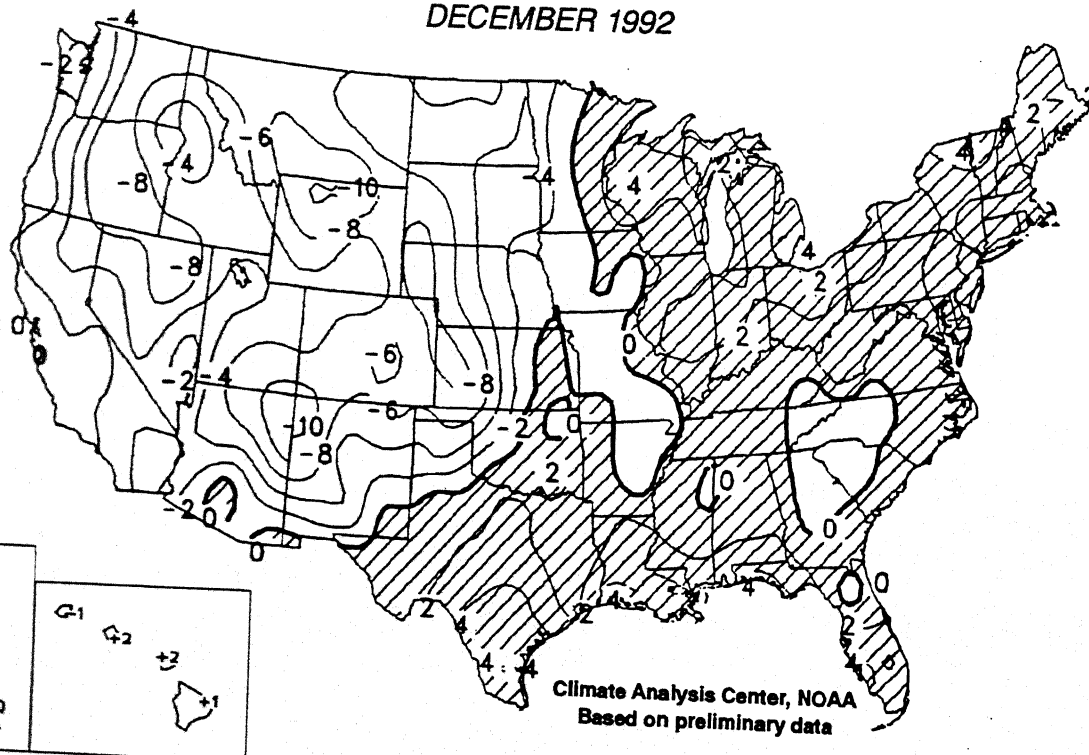


FIGURE 4. December 1992 Departure of Average Temperature from Normal (°F). Shaded areas experienced above normal temperatures. Cold weather dominated the western half of the country, with departures down to -10°F observed in the Four Corners area of the Southwest and in north-central Wyoming. In contrast, above normal temperatures were widespread across the eastern half of the country.

